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I. SESSION DESCRIPTION

ID: B2a

Ecosystem services assessment methods for riverine and wetland ecosystems

	Title	Name	Organisation	E-mail
Host:	Dr.	Mauro Carolli	Leibniz-Institute für Gewässerökologie und Binnenfischerei	carolli@igb-berlin.de
	Dr.	Jan H. Janse	PBL Netherlands Environmental Assessment Agency; and Neth. Institute of Ecology	jan.janse@pbl.nl
Co-host(s):	Dr.	Simone Podschun	Leibniz-Institute für Gewässerökologie und Binnenfischerei	podschun@igb-berlin.de
	Dr.	Martin Pusch	Leibniz-Institute für Gewässerökologie und Binnenfischerei	pusch@igb-berlin.de
	Dr.	Anne van Dam	N-IHE Institute for Water Education	a.vandam@un-ihe.org

Abstract:

River and their related floodplains, wetlands and lakes are among the most complex and dynamic ecosystems and often still represent biodiversity hotspots. They are generally recognized as indispensable for key regulating ecosystem services such as freshwater provision, natural water purification, net carbon sequestration, flood protection as well as biodiversity and food provision. They provide 'nature-based solutions' for several Sustainable Development Goals (SDGs) from their very nature. In freshwater ecosystems physical and ecological processes have been historically modified, leading to a loss in the capacity to provide ES, underlying that, despite international agreements, laws and directives on their protection and 'wise use', these services are often not well valued in practice. The

quantification of these services is still not consistent, and case studies that include various ecosystem services are still not common (Hanna et al., 2018).

Moreover, in several catchments, conflicts have arisen among the different stakeholders involved in the management of freshwater ecosystems, whereby the decision makers have to deal with legal constraints from different laws. The contribution of rivers and wetlands to these services depends on local or regional context. The efficacy of international policies would benefit from a global picture of these services, and generalized insights on their effectiveness dependent on circumstances, hydrological and ecological features, use and management, and how they will react to climate change. This would bring the 'climate' and 'nature' communities closer together. This session aims to combine modelling and assessment studies on ecosystem services from different wetland types from various climatic regions to help building this global picture and to sustain international policy goals.

The session begins with three opening talks about different ES projects. In the RESI project – River Ecosystem Service Index – an integrated approach was developed that uses several indicators to quantify various ES provided by rivers and floodplains as well as their synergies and trade-offs for different case studies in Germany (Podschun et al. 2018). The HyMoCARES project aimed to develop a conceptual framework and operational tools to integrate ES in Alpine river basin planning and management, with a special focus on hydromorphological factors. A third introduction will be on a project incorporating aquatic ecosystem services in a global-scale environmental model (Janse et al., 2019). Furthermore, we invite studies that deal with the ES quantification in riverine and wetland ecosystems and studies that deal with the analysis of ES bundles, synergies, and trade-offs, from the catchment to the global scales. This session is linked to another session about: "Frontiers in Planning and Implementing Nature-based Solutions in River Landscapes: Insights and Innovations from Interdisciplinary Research".

Goals and objectives of the session:

Bring together modelling and assessment studies at global or regional scales on the ecosystem services of inland wetlands and lakes, to assess general insights for prioritization of protection measures, wise use and management of these ecosystems. We explore how the ES can support river basin management through: – necessary data quantity and quality for a sound assessment of the ES in riverine ecosystems – exchange of experiences of development and use of methods (e.g., qualitative methods, quantitative methods, models) to quantify riverine ES – cross-sectoral approach for the management of riverine landscapes (analysis of bundles, synergies, and trade-offs; scenarios; implementation of the ES concept in practice). This session, together with the session on Implementing nature-based solutions in river landscapes, also aims to contribute to the (re)activating of the ESP Working Group on Inland waters.



Planned output / Deliverables:

To be decided: joint publication or special issue, contribution to a policy-oriented forum.

Related to ESP Working Group/National Network:

[Biome working group: BWG 2A – Freshwater](#)

II. SESSION PROGRAM

Date of session: Tuesday, 22 October 2019

Time of session: 10:30 – 15:00

Timetable speakers

Time	First name	Surname	Organization	Title of presentation
10:30– 10:35	Mauro	Carolli	Leibniz–Institute of Freshwater Ecology and Inland Fisheries	Introduction to the session
10:35– 10:45	Simone	Podschun	Leibniz–Institute of Freshwater Ecology and Inland Fisheries	Assessing the ecosystem service composition in rivers and floodplains – The River Ecosystem Service Index (RESI)
10:45– 10:55	Lena	Hornung	Leibniz–Institute of Freshwater Ecology and Inland Fisheries	Linking ecosystem services and measures in river and floodplain management
10:55– 11:05	Mauro	Carolli	Leibniz–Institute of Freshwater Ecology and Inland Fisheries	Hydromorphology and river ecosystem services: the HyMoCARES project
11:05– 11:15	Nangware Kajia	Msofe	School of Environment, Northeast Normal University, Changchun 130024, China	Planning and management of the riverine ecosystem: Estimates of ecosystem services values response to land use/cover change on the Kilombero River catchment, Southern Tanzania
11:15– 11:25	Stefano Davide	Murgese	SEAcop STP	Ecosystem services valuation for the definition of protected areas management plans and for increasing climate change resilience: the case of Riverine



Time	First name	Surname	Organization	Title of presentation
				Gesso and Stura Park (Cuneo Province, Piedmont Region, Italy)
11:25– 11:35	Yonatan	Yaakobi	The Porter School of the Environment and Earth Sciences (PSEES), Tel Aviv University	How much is an urban stream worth? Economic assessment of cultural ecosystem services of an urban stream in the Galilee
11:35– 11:45	Kåre	Flatlandsmo	Økosystemtenester AS	Environmental cost of hydropower production
11:45– 11:55	Agnes	Vari	MTA Centre for Ecological Research, GINOP Sustainable Ecosystems Group, Tihany	Flood regulation as an ecosystem service – disentangling mechanisms, frameworks and the messages behind assessments
11:55– 12:00				Short pitches of related posters
13:30– 13:40	Jan H	Janse	PBL Neth. Environmental Assessment Agency, Den Haag, the Netherlands	Towards a global model for regulating ecosystem services of inland wetlands
13:40– 13:50	Nazmul	Huq	ITT, TH Köln	Interactions between freshwater ecosystem services and land cover changes in southern Bangladesh: A perspective from short term (seasonal) and long-term (1973–2014) scale
13:50– 14:00	Sourya	Das	Watershed Organisation Trust (WOTR)	Ecosystem Services of Wetlands: empirical evidence of West Bengal, India
14:00– 14:10	Ralf-Uwe	Syrbe	Leibniz Institute of Ecological Urban and Regional Development	Ecosystem services and stakeholder perspectives in mangrove forests. Results from Singapore, Brazil, Fiji, and South Africa



Time	First name	Surname	Organization	Title of presentation
14:10– 14:20	Vytautas	Narusevicius	Vilnius University	Challenges of ecosystem services assessment in protected small islands of inland waters
14:20– 14:30	Session organizers		Synthesis: approaches for aquatic ecosystem services	
14:30– 15:00	All participants			General discussion: (a) Perspectives for ecosystem services of aquatic systems; (b) Reviving the ESP working group on freshwater ecosystems

III. ABSTRACTS

The abstracts appear in alphabetic order based on the last name of the first author. The first author is the presenting author unless indicated otherwise.

1. Type of submission: **Abstract**

B. Biome Working Group sessions: B2a Ecosystem services assessment methods for riverine and wetland ecosystems

Hydromorphology and river ecosystem services: the HyMoCARES project

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Rivers and their floodplains support human activities with several important ecosystem services. Alpine rivers flow into densely populated and intensely used areas, they have been historically exploited for their services, and their hydrology and morphology have been profoundly regulated and modified. Hydromorphology has a fundamental role in shaping and maintain river habitats, river landscapes and the related ecological functions and its alterations have consequences on the provisioning of ecosystem services. In the HyMoCARES project we developed an approach to identify qualitatively through a conceptual framework the



8. *Type of submission: Abstract*

B. Biome Working Group sessions: B2a Ecosystem services assessment methods for riverine and wetland ecosystems

Ecosystem services valuation for the definition of protected areas management plans and for increasing climate change resilience: the case of Riverine Gesso and Stura Park (Cuneo Province, Piedmont Region, Italy)

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Protected areas management plans are generally based on information collected within parks/reserves borders, whereas dynamics influencing ecosystems often develop at larger scale. Ecosystem Services (ES) valuation allow overcoming this potential limitation (i.e. the study of nutrient concentration of water must be extended to hydrological/hydrogeological watersheds). Furthermore, indicators based on ES provide a direct information on policies performances regarding biodiversity and ecosystems resilience to climate change (CC) impacts and allow the prompt activation of corrective measures. Finally, the monetary value of ES provision by protected areas is an effective communication tool when dealing with other land-management authorities and for public information.

Based on these considerations, for the definition of the Riverine Gesso and Stura Park Management Plan, the valuation of specific ES was introduced as support tool to define management indicators. ES were selected according to three main factors: (1) institutional goals of the Park, (2) specific environmental conditions of investigated areas and their surroundings, (3) the ongoing definition of the Forestry Management Plan for the riverine corridor, that includes the studied protected areas. Considered ES were the following: food provision, potential wood provision, climate regulation (carbon sequestration), habitat quality, nutrient regulation in freshwaters, flood risk mitigation, educational activities.

The ES valuation provided the following outputs, which were included in the Riverine Gesso and Stura Park management plan: (a) performance indicators based on ES valuation that depict, in a comprehensive manner, the impacts of climate modifications on ecosystems, allowing a



consistent management activity to preserve and increase protected-areas resilience to CC; (b) specific ES influence areas to be considered for the definition of effective management policies and for the calculation of ES indicators; (c) a communication tool to increase people awareness on the relevance of nature conservation.

Keywords: ecosystem services, riverine ecosystems, climate change, environmental indicator, resilience

9. *Type of submission: Abstract*

B. Biome Working Group sessions: [B2a Ecosystem services assessment methods for riverine and wetland ecosystems](#)

Challenges of ecosystem services assessment in protected small islands of inland waters

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As a result of first steps of implementation of the LIFE project in Lithuania on proper management of the habitats as well as creation of new suitable breeding sites in Special Protected Areas for species of EU importance, the uncommon issue appeared during the selection of appropriate basic ecosystem for further identification of relevant ecosystem services to be monitored, taking into account the specificity of the target sites (small islands and sandy floodplains in inland water bodies, scattered in the territory of Lithuania) and their habitats, as well as the Project activities (restoration and management of above mentioned sites). The exercise was solved by selecting the most relevant ecosystem services, common to sparsely vegetated areas and dunes.

Main user groups of ecosystem services in the Project areas were identified as follows: local community (benefiting from the full spectrum of ecosystem services), inhabitants of surrounding municipalities and users of the Project areas on the national level – numerous visitors of state protected areas, lakes, watercourses and other recreational and ecotourism destinations, situated relatively close to the Project activities' areas. But, taking into account, again, specificity of expected Project impact and some already existing overuse and disturbance practices in the Project activities' sites, even social survey results in some cases